



**CALIFORNIA STATE SCIENCE FAIR
2009 PROJECT SUMMARY**

Name(s) S. Kennedy Placek	Project Number J1030
Project Title How Much Energy Can a Residential Hydroelectric System Generate?	
<p style="text-align: center;">Abstract</p> <p>Objectives/Goals To determine if the run off from rain on residential rooftops can be harnessed to the degree that rooftop hydroelectric systems can be developed to contribute to energy production and have a positive impact on environmental issues.</p> <p>Methods/Materials A loop wing wind generator set, including a model test car (I converted it into a water wheel but maintained the ability to generate and measure the electricity created). Balsa wood for the water wheel, a hot glue gun and 1/8" plywood made into v-shaped slews (water flows and increases velocity). A measuring tape to measure the head of the flow, wood glue and duct tape. A stop watch to time the model car run time and a garden hose to replicate rainwater. Copper pipes for Concept 2 and a hair dryer for the wind generator. Wind meter.</p> <p>Results The actual loop wing wind generator was the most efficient at generating power. The light weight blades were hard to match with the balsa wood constructed water wheel. In two minutes of rotation (using hair dryer of 15 knots of wind), it generated 45 seconds of run time for the test vehicle. This run time was compared to just 18 seconds of run time for the Concept 1 system using 126 liters of water over a two minute period of time. Concept 1 is the invention of V shaped micro slews to channel rainfall into a single spout on each side of the house to generate maximum velocity and volume as the water hits. Concept 2 uses micro water wheels at the base of every V shaped channel. Concept 2 did not generate electricity in the 2 minute test.</p> <p>Conclusions/Discussion Each year millions of gallons of rain water run off roof tops in the United States. Concept 1 proved that a water wheel can be used to create a micro hydroelectric plant on residential roofs using the V-shaped channels that I invented. While the second concept did not generate electricity during the same time period, I believe that with the use of lighter materials and a more efficient design, this system has great potential to out perform both the wind loop and Concept 1.</p>	
Summary Statement Creating a residential rooftop hydroelectric system using rainwater.	
Help Received My father helped assemble the gears and body of the model car and assisted me in cutting pieces of wood for the water wheel.	